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CLAIMS

What is claimed is:

1. A method for preventing detachment of functional solder bumps from a flip chip having empty spaces between adjacent ones of the functional solder bumps, comprising the step of:

stabilizing the functional solder bumps on the flip chip by providing an anchoring solder bump in each of at least a portion of the empty spaces.

2. The method of claim 1 wherein each of said empty spaces has a width of from about 150 um to about 500 um.

3. The method of claim 1 wherein said providing an anchoring solder bump in at least a portion of the empty spaces comprises the steps of providing an anchoring bump pad in each of the at least a portion of the empty spaces and providing said anchoring solder bump on said anchoring bump pad.

4. The method of claim 3 wherein each of said empty spaces has a width of from about 150 um to about 500 um.

5. The method of claim 1 wherein said anchoring solder bump is a material selected from the group consisting of lead, copper, silver and nickel.

6. The method of claim 5 wherein each of said empty spaces has a width of from typically about 150 um to about 500 um.

7. The method of claim 5 wherein said providing an anchoring solder bump in at least a portion of the empty spaces comprises the steps of providing an anchoring bump pad in each of the at least a portion of the empty spaces and providing said anchoring solder bump on said anchoring bump pad.

8. The method of claim 7 wherein each of said empty spaces has a width of from typically about 150 um to about 500 um.

9. The method of claim 1 further comprising the step of providing a solder bridge between said anchoring solder bump and one of the functional solder bumps.

10. The method of claim 9 wherein each of said empty spaces has a width of from typically about 150 um to about 500 um.

11. The method of claim 9 wherein said providing an anchoring solder bump in at least a portion of the empty spaces comprises the steps of providing an anchoring bump pad in each of the at least a portion of the empty spaces and providing said anchoring solder bump on said anchoring bump pad.

12. The method of claim 9 wherein said anchoring solder bump comprises lead.

13. A method for preventing detachment of functional solder bumps from a flip chip having empty spaces between adjacent ones of the functional solder bumps, comprising the steps of:

stabilizing the functional solder bumps on the flip chip by providing anchoring solder bumps in at least a portion of the empty spaces, respectively; and

providing a printed circuit board substrate on said functional solder bumps and said anchoring solder bumps.

14. The method of claim 13 wherein each of said empty spaces has a width of from typically about 150um to about 500um.

15. The method of claim 13 wherein said providing anchoring solder bumps in at least a portion of the empty spaces, respectively, comprises the steps of providing anchoring bump pads in the at least a portion of the empty spaces, respectively, and providing said anchoring solder bumps on said anchoring bump pads, respectively.

16. The method of claim 13 wherein each of said anchoring solder bumps comprises lead.

17. A method for preventing detachment of functional solder bumps from a flip chip having empty spaces between adjacent ones of the functional solder bumps, comprising the steps of:

stabilizing the functional solder bumps on the flip chip by providing anchoring solder bumps in at least a portion of the empty spaces, respectively;

providing a solder bridge between each of said anchoring solder bumps and one of the functional solder bumps; and

providing a printed circuit board substrate on said functional solder bumps and said anchoring solder bumps.

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18. The method of claim 17 wherein each of said empty spaces has a width of from typically about 150um to about 500um.

19. The method of claim 17 wherein said providing anchoring solder bumps in at least a portion of the empty spaces, respectively, comprises the steps of providing anchoring bump pads in the at least a portion of the empty spaces, respectively, and providing said anchoring solder bumps on said anchoring bump pads, respectively.

20. The method of claim 17 wherein each of said anchoring solder bumps comprises lead.